

COURSE SLO ASSESSMENT REPORT, SCC

Department: ___Chemistry_____ Course: _____Chem 249_____

Year: ___2013_____ Semester: ___Spring_____

1) Outcome to be assessed by dept members	A- Apply major concepts of chemical reactivity of organic compounds to solve problems					
2) Means of assessment and criteria of success	A multiple choice final exam will be given to test the students' basic understanding of concepts covered in Organic Chemistry.					
3) Summary of data collected	Two sections of chem. 249 were assessed with 36 students. Forty multiple choice question exam was given with an average of 29.1 correct answers (72.8%).					
	Question number	Number of wrong answers	% students missed	Question number	Number of wrong answers	% students missed
	1	25	69%	21	17	47%
	2	2	6%	22	23	64%
	3	2	6%	23	3	8%
	4	2	6%	24	11	31%
	5	0	0%	25	13	36%
	6	5	14%	26	8	22%
	7	12	33%	27	7	19%
	8	19	53%	28	12	33%
	9	8	22%	29	4	11%
	10	1	3%	30	7	19%
	11	3	8%	31	7	19%
	12	0	0%	32	2	6%
	13	0	0%	33	9	25%
	14	6	17%	34	7	19%
	15	23	64%	35	24	67%
	16	26	72%	36	5	14%
	17	18	50%	37	7	19%
	18	11	31%	38	14	39%
	19	30	83%	39	7	19%
	20	1	3%	40	11	31%

<p>4) Analysis and discussion of data</p>	<p>The students had trouble with the following concept questions: Question # 1 (Constitutional isomers) Question # 8 (Chair cyclohexane conformations) Question # 15 (Carbocation rearrangement) Question # 16 (Stereochemistry of dehydrohalogenation) Question #19 (tosylate resonance) Question #22 (degrees of unsaturation and structure) Question # 35 (E vs S_N2)</p> <p>Only 10 out of 36 students (28%) scored below 70% on the MCQ part of the final exam. That means we have 72% of the students achieving SLO A on the course.</p>
<p>5) How your EMP and DPP planning process will utilize what was learned through the analysis of your program's assessment of learning outcomes</p>	<p>Based on commonly missed questions in the previous year, we modified the wording on some of the commonly missed questions as well as introduced stereoisomerism earlier in the semester. We have shown improvement in the area of stereoisomers and regiochemistry compared to the year prior ; however, 5 of the 7 questions with high percentage of wrong answers (#s 1, 8, 15, 16, & 35) are still the same from the year before. They are tough concepts, but we will look into how we cover those topics in lecture and see if any further revisions are needed for clarification in the MCQs. After review, we will be changing questions 19 & 22. The concept of resonance will still be covered, but not using the specific case of tosylate for question 19. Degrees of unsaturation is covered more extensively in Chem 259, so that question will be changed completely.</p>

1) Outcome to be assessed by dept members	B- Write in scientific terms and interpret patterns of reactivity on the basis of mechanistic reasoning				
2) Means of assessment and criteria of success	A rubric will be used to show their ability to use mechanistic reasoning to write a complete mechanism for a reaction they are not familiar with. The mechanism was for the hydrobromination of 3,3-dimethyl cyclopentene to form 1-bromo-1,2-dimethylcyclopentane.				
3) Summary of data collected	Two sections were assessed with 36 students.				
		Beginning (0)	Developing (1)	Competent (2)	Accomplished (3)
	Electron flow consistent with nucleophiles, electrophiles, leaving group or rearrangement in each step	1 student (3%)	2 students (6%)	4 students (11%)	29 students (81%)
	Charges are always depicted on all intermediates	1 student (3%)	2 students (6%)	1 student (3%)	28 students (78%)
	Product of each step in the mechanism is clearly drawn	-----	3 students (8%)	1 student (3%)	32 students (89%)
4) Analysis and discussion of data	From the above data, it is clear that 33 students (92%) are competent or above at writing reaction mechanisms. Only 3 students were below. We can safely say that 92% of our Chem 249 students achieved SLO B.				
5) How your EMP and DPP planning process will utilize what was learned through the analysis of your program's assessment of learning outcomes	This is a drastic increase compared to last year's results (only 43% of students were competent or above). This can be attributed to the increased practice in the form of worksheets given to the students as well as a change in textbooks. The current textbook (Klein's Organic Chemistry 1 st edition) introduces mechanisms much earlier in the text (Ch. 2) than the previously used textbook. It makes students start using mechanisms and curved arrow notation by the second week of class and continues throughout the entire course. Practice and understanding reactions through mechanisms is helping the students master this skill and SLO.				

1) Outcome to be assessed by dept members	C- Follow published reaction protocols to synthesize, isolate, purify and characterize compounds using standard laboratory equipment and modern instrumentation then interpret laboratory results																																											
2) Means of assessment and criteria of success	A rubric is used to grade their laboratory report. This particular laboratory report was for synthesis protocol using Grignard reagent. They had to provide a full laboratory report and include IR analysis of their product.																																											
3) Summary of data collected	<p>Two sections were assessed with 35 students.</p> <table border="1" data-bbox="443 493 1885 1268"> <thead> <tr> <th></th> <th>Beginning 0</th> <th>Developing 1</th> <th>Competent 2</th> <th>Accomplished 3</th> </tr> </thead> <tbody> <tr> <td>Purpose</td> <td>-----</td> <td>2 students (6%)</td> <td>20 students (57%)</td> <td>13 students (37%)</td> </tr> <tr> <td>Reaction and Mechanism</td> <td>3 students (9%)</td> <td>14 students (40%)</td> <td>2 students (6%)</td> <td>16 students (46%)</td> </tr> <tr> <td>Physical data table with theoretical yield</td> <td>-----</td> <td>24 students (69%)</td> <td>6 Students (17%)</td> <td>5 students (14%)</td> </tr> <tr> <td>Procedure</td> <td>-----</td> <td>-----</td> <td>2 students (6%)</td> <td>33 students (94%)</td> </tr> <tr> <td>Observation and data (observation, masses, m.p. and IR/GC)</td> <td>-----</td> <td>2 students (6%)</td> <td>3 students (9%)</td> <td>30 students (86%)</td> </tr> <tr> <td>Calculations</td> <td>-----</td> <td>7 students (20%)</td> <td>13 students (37%)</td> <td>15 students (43%)</td> </tr> <tr> <td>Analysis (yield, m.p., purity, GC/IR)</td> <td>1 student (3%)</td> <td>4 students (11%)</td> <td>6 students (17%)</td> <td>23 students (66%)</td> </tr> </tbody> </table> <p>Overall score on the lab report/assessment (out of 21 possible): 0: -- 1: -- 2: -- 3: -- 4: --</p>					Beginning 0	Developing 1	Competent 2	Accomplished 3	Purpose	-----	2 students (6%)	20 students (57%)	13 students (37%)	Reaction and Mechanism	3 students (9%)	14 students (40%)	2 students (6%)	16 students (46%)	Physical data table with theoretical yield	-----	24 students (69%)	6 Students (17%)	5 students (14%)	Procedure	-----	-----	2 students (6%)	33 students (94%)	Observation and data (observation, masses, m.p. and IR/GC)	-----	2 students (6%)	3 students (9%)	30 students (86%)	Calculations	-----	7 students (20%)	13 students (37%)	15 students (43%)	Analysis (yield, m.p., purity, GC/IR)	1 student (3%)	4 students (11%)	6 students (17%)	23 students (66%)
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	<p>5: -- 6: -- 7: -- 8: -- 9: -- 10: -- 11: 2 students (6%) 12: 2 students (6%) 13: 2 students (6%) -----Competent----- 14: 5 students (14%) 15: 2 students (6%) 16: 5 students (14%) 17: 3 students (9 %) 18: 5 students (14%) 19: 2 students (6%) 20: 4 students (11%) 21: 2 students (6%)</p> <p>Note: “competent” in each section is equivalent to a score of “2”. Competent on all 7 sections would equal an overall score of 14.</p>
<p>4) Analysis and discussion of data</p>	<p>From the above data, we can see that approximately 82% of the students are competent or above in writing laboratory reports. The students are struggling with making their physical data table and calculating a theoretical yield (only 31% were competent or above) and they are weak in including a reaction mechanism (only 52% were competent or above). It should be noted that students did extremely well on writing reaction mechanism on their assessment of SLO B, most just did not include a mechanism in their lab report. This was the last lab of the semester and fatigue may have played a role in the outcome.</p>
<p>5) How your EMP and DPP planning process will utilize what was learned through the analysis of your program's assessment of learning outcomes</p>	<p>Overall, the students are doing well at writing lab reports. This comes from the repeated practice while writing at least one lab report per week throughout the semester of Chem 249. In order to improve student achievement in the lacking areas, we will increase the time spent covering how to properly set up a physical data table and calculate a theoretical yield as well as provide the students with a sample table and calculation. Instead of covering the requirements for formal lab reports at the beginning of the semester, we will introduce it after 4-5 weeks, when they start actually writing them. We will also spend more time in lab covering reaction mechanisms of the experiments performed.</p>